

Iron

Working procedure

Principle

Iron(II) ions react with FerroZine^(R) to form a violet complex compound. Iron (III) ions in the water sample are reduced by ascorbic acid to iron(II) ions before the complex is formed.

Range of application

Boiler water, raw water, drinking water, mineral water

Measuring range

0.005 - 0.25 mg/l (50 mm cuvette)

0.050 - 2.00 mg/l (round cuvette)

Accessories

Plastic semimicro cuvettes, 50 mm, with lid (LZP 341)

Round cuvettes with rubber stoppers (LCW 906)

Variable pipette 1 - 5 ml (BBP 065)

Pipette tips for BBP 065 (BBP 068)

Variable pipette 0.2 - 1.0 ml (BBP 078)

Pipette tips for BBP 078 (BBP 079)

Storage information

The test reagents are stable at +15 to +25°C up to the expiry date given on the package.

pH/Temperature

The pH of the water sample should be between 3 and 7. The temperature of the water sample and the reagents must be between 15 and 25°C.

Interferences

Copper concentrations of more than 0.1 mg/l cause high-bias results. Higher copper concentrations can be masked by introducing approx. 20 mg solid thiourea into the (still empty) test cuvette. Up to 10 mg/l zinc or manganese(II) do not interfere with the determination. We have not determined the possible influence of other ions. The presence of oxidizing agents inhibits the colour reaction.

For special attention

1. Boiler water (e.g. condensate) and turbid or coloured water samples frequently contain undissolved or complexed iron, which is not always fully detected by the determination. To determine total iron, e.g. in boiler water samples, a digestion must therefore always be carried out with the **Crack Set LCW 902**, taking account of a reagent blind value. If only dissolved iron is to be determined, the sample can be filtered before the test is carried out. If the filtrate is coloured, a sample blank value (for preparation see procedure, but **without addition of MicroCap^(R)**) must be measured separately and subtracted.
2. The cuvettes must be thoroughly cleaned and dried with iron-free distilled or deionized water **before use** (especially if they are to be used more than once). When evaluations are carried out in 50 mm semimicro cuvettes it is very important that the path of the beam through the bottom half of the cuvette is free of air bubbles. Any air bubbles clinging to the sides can be removed by gently inverting the cuvette or tapping the side.

Safety advice

On grounds of quality and reliability, the analyses should be carried out only with original Dr. Lange accessories.

Buffer solution B (LCW 021 B) contains:

Sodium hydroxide

R: 34 S: 26-37/39-45



	Measuring range 0.005 - 0.25 mg/l	
	Pipette into a 50 mm semimicro cuvette (LZP 341)	
	Acid reagent A	0.2 ml
	Water sample	5.0 ml
	Leave for at least 2 min. Then pipette into the cuvette	
	Buffer solution B	0.3 ml

Add MicroCap^(R) C, close cuvette and invert it a few times until the lyophilisate of MicroCap^(R) is dissolved. After **15 min** invert the cuvette once, clean the outside thoroughly and evaluate **Avoid air bubbles!**

	Measuring range 0.05 - 2.00 mg/l	
	Pipette into a round cuvette (LCW 906)	
	Acid reagent A	0.2 ml
	Water sample	5.0 ml
	Leave for at least 2 min. Then pipette into the cuvette	
	Buffer solution B	0.3 ml

Add MicroCap^(R) C, close cuvette and invert it a few times until the lyophilisate of MicroCap^(R) is dissolved. After **15 min** invert the cuvette once, clean the outside thoroughly and evaluate.

Evaluation (round cuvette) 0.05 - 2.00 mg/l

1. Insert **560 nm** program filter.
2. Press **Mode** key and wait for zero measurement to be carried out.
3. Select "EXT" mode (**Mode** key).
4. Use "." and **Mode** keys to set factor **'2.178'** (without Crack Set) or factor **'2.614'** (with Crack Set). "Konz./2.178" or "Konz./2.614" is displayed
5. Insert cuvette containing **distilled water**. "0" is displayed.
6. Insert sample cuvette.
7. Subtract **"0.046 mg/l"** (without Crack Set) or **"0.055 mg/l"** (with Crack Set) from the displayed result.

Evaluation (50 mm semimicro cuvette) 0.005 - 0.25 mg/l

1. Insert **535 nm** filter (LASA 30).
2. Use cursor key to select "EXT/TRANS" mode, then press **OK** key.
3. Press cursor key ▼ to open submenu. Use cursor key to select wavelength **535 nm**, then press **OK** key (LASA 100).
4. Use cursor key to select "Faktor" mode, then press **OK** key.
5. Use cursor keys to select factor **0.559** (without Crack Set) or factor **0.671** (with Crack Set), then press **OK** key.
6. Insert 50 mm cuvette containing **distilled water** and press **blue key**. "Null" is displayed.
7. Insert sample cuvette and press **green key**.
8. Subtract **"0.042 mg/l"** (without Crack Set) or **"0.050 mg/l"** (with Crack Set) from the displayed result.

Evaluation (round cuvette) 0.05 - 2.00 mg/l

1. Insert **535 nm** filter (LASA 30).
2. Use cursor key to select "EXT/TRANS" mode, then press **OK** key.
3. Press cursor key ▼ to open submenu. Use cursor key to select wavelength **535 nm**, then press **OK** key (LASA 100).
4. Use cursor key to select "Faktor" mode, then press **OK** key.
5. Use cursor keys to select factor **2.405** (without Crack Set) or factor **2.886** (with Crack Set), then press **OK** key.
6. Press **blue key**. "Null" is displayed.
7. Insert sample cuvette and press **green key**.
8. Subtract **"0.147 mg/l"** (without Crack Set) or **"0.176 mg/l"** (with Crack Set) from displayed result

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Evaluation (50 mm semimicro cuvette)

0.005 - 0.25 mg/l

1. Call program "EXT".
2. Set measurement wavelength $\lambda 1=565$ " and factor "F=0.459" (without Crack Set) or factor "F=0.551" (with Crack Set).
3. Insert 50 mm cuvette containing **distilled water** and press **blue key**. "0" is displayed.
4. Insert sample cuvette and press **green key**.
5. Subtract "**0.032 mg/l**" (without Crack Set) or "**0.038 mg/l**" (with Crack Set) from the displayed result.

Evaluation (round cuvette)

0.05 - 2.00 mg/l

1. Call program "EXT".
2. Set measurement wavelength $\lambda 1=565$ " and factor "F=1.982" (without Crack Set) or factor "F=2.378" (with Crack Set).
3. Press **blue key**. "0" is displayed.
4. Insert sample cuvette and press **green key**.
5. Subtract "**0.137 mg/l**" (without Crack Set) or "**0.164 mg/l**" (with Crack Set) from the displayed result.

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Evaluation (50 mm semimicro cuvette)

0.005 - 0.25 mg/l

1. Select "Ext/Trans" mode.
2. Use the cursor keys to set wavelength **564 nm**.
3. Select "Faktor" mode.
4. Use the cursor keys to select factor "**0.451**" (without Crack Set) or factor "**0.541**" (with Crack Set).
5. Zeroize by inserting 50 mm cuvette containing **distilled water** and pressing **blue key**.
6. Insert sample cuvette and press **green key**.
7. Subtract "**0.041 mg/l**" (without Crack Set) or "**0.049 mg/l**" (with Crack Set) from the displayed result.

Evaluation (round cuvette)

0.05 - 2.00 mg/l

1. Select "Ext/Trans" mode.
2. Use the cursor keys to set wavelength **564 nm**.
3. Select "Faktor" mode.
4. Use the cursor keys to select factor "**1.929**" (without Crack Set) or factor "**2.315**" (with Crack Set).
5. Zeroize by pressing **blue key**.
6. Insert sample cuvette and press **green key**.
7. Subtract "**0.111 mg/l**" (without Crack Set) or "**0.133 mg/l**" (with Crack Set) from the displayed result.

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Evaluation (50 mm semimicro cuvette)

0.005 - 0.25 mg/l

1. Call "EXT" mode.
2. Set wavelength " λ " or " $\lambda 1$ " to **564 nm**.
3. Enter factor "**0.451**" (without Crack Set) or factor "**0.541**" (with Crack Set).
4. Insert 50 mm cuvette containing **distilled water** and press **blue key** or "**NULL**".
5. Insert sample cuvette and press **green key** or "**MESS**".
6. Subtract "**0.041 mg/l**" (without Crack Set) or "**0.049 mg/l**" (with Crack Set) from displayed result

Evaluation (round cuvette)

0.05 - 2.00 mg/l

1. Call "EXT" mode.
2. Set wavelength " λ " or " $\lambda 1$ " to **564 nm**.
3. Enter factor "**1.929**" (without Crack Set) or factor "**2.315**" (with Crack Set).
4. Press **blue key** or "**NULL**".
5. Insert sample cuvette and press **green key** or "**MESS**".
6. Subtract "**0.111 mg/l**" (without Crack Set) or "**0.133 mg/l**" (with Crack Set) from displayed result

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Evaluation (50 mm semimicro cuvette)

0.005 - 0.25 mg/l

1. Call "EXT" mode and set wavelength $\lambda = 564 \text{ nm}$.
2. Insert 50 mm cuvette containing **distilled water** and press **NULL** key. "0" is displayed.
3. Insert sample cuvette and press **MESS** key.
4. Multiply the displayed absorbance value by factor **0.449** (without Crack Set) or factor **0.539** (with Crack Set).
5. Subtract **0.042 mg/l** (without Crack Set) or **0.050 mg/l** (with Crack Set) from displayed result

Evaluation (round cuvette)

0.05 - 2.00 mg/l

1. Call "EXT" mode and set wavelength $\lambda = 564 \text{ nm}$.
2. Insert round cuvette containing **distilled water** and press **NULL** key. "0" is displayed.
3. Insert sample cuvette and press **MESS** key.
4. Multiply the displayed absorbance value by factor **1.925** (without Crack Set) or factor **2.310** (with Crack Set).
5. Subtract **0.047 mg/l** (without Crack Set) or **0.056 mg/l** (with Crack Set) from displayed result

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Evaluation (50 mm semimicro cuvette)

0.005 - 0.25 mg/l

1. Call submenu "Ext/Trans".
2. Set wavelength **564 nm**.
3. Enter factor "**0.448**" (without Crack Set) or factor "**0.538**" (with Crack Set).
4. Insert 50 mm cuvette containing **distilled water** and press **blue key**. "NULL" is displayed.
5. Insert sample cuvette and press **green key**.
6. Subtract "**0.041 mg/l**" (without Crack Set) or "**0.049 mg/l**" (with Crack Set) from displayed result

Evaluation (round cuvette)

0.05 - 2.00 mg/l

1. Call submenu "Ext/Trans".
2. Set wavelength **564 nm**.
3. Enter factor "**1.924**" (without Crack Set) or factor "**2.309**" (with Crack Set).
4. Press **blue key**. "NULL" is displayed.
5. Insert sample cuvette and press **green key**.
6. Subtract "**0.119 mg/l**" (without Crack Set) or "**0.143 mg/l**" (with Crack Set) from displayed result